



НАУЧНИ ТРУДОВЕ
НА ИНСТИТУТ ПО ЗЕМЕДЕЛИЕ – КАРНОБАТ

SCIENTIFIC WORKS
OF THE INSTITUTE OF AGRICULTURE – KARNOBAT

Volume 2

Том 2

№ 1

2013

КАРНОБАТ

ГЛАВЕН РЕДАКТОР: EDITOR IN CHIEF:

Проф. д-р Драгомир Вълчев (България) Prof. Dragomir Vulchev, Ph. D (Bulgaria)

РЕДАКЦИОННА КОЛЕГИЯ: EDITORIAL BOARD:

Доц. д-р Дарина Вълчева (България)	Assoc. Prof. Darina Valcheva, Ph. D (Bulgaria)
Доц. д-р Тодорка Савова (България)	Assoc. Prof. Todorka Savova, Ph. D (Bulgaria)
Гл. ас. д-р Боряна Дюлгерова (България)	Assist. Prof. Boryana Dulgerova, Ph. D (Bulgaria)
Доц. д-р Дина Атанасова (България)	Assoc. Prof. Dina Atanasova, Ph. D (Bulgaria)
Доц. д-р Милка Димитрова-Донева (България)	Assoc. Prof. Milka Dimitrova-Doneva, Ph.D (Bulgaria)
Доц. д-р Василина Манева (България)	Assoc. Prof. Vasilina Maneva, Ph. D (Bulgaria)
Д-р Ирфан Озтурк (Турция)	Assoc. Prof. Irfan Ozturk, Ph. D (Turkey)
Доц. д-р Ялчин Кая (Турция)	Assoc. Prof. Yalcin Kaya, Ph. D (Turkey)
Проф. д-р Любчо Михайлов (Македония)	Prof. Ljupco Mihajlov, Ph. D (Macedonia)

ТЕХНИЧЕСКИ РЕДАКТОР: TECHNICAL EDITOR:

Гл. ас. д-р Боряна Дюлгерова (България) Assist. Prof. Boryana Dulgerova, Ph. D (Bulgaria)

ТЕХНИЧЕСКИ СЕКРЕТАР: TECHNICAL SECRETARY:

Гл. ас. Маргарита Гочева (България) Assist. Margarita Gocheva (Bulgaria)

ИЗДАТЕЛ: PUBLISHER:

Институт по земеделие	Institute of agriculture
8400 гр. Карнобат	Karnobat 8400
Ул. „Индустириална“ 1	1 Industrialna Str.
тел.: 0559 2 27 31,	tel.: 0559 2 27 31
факс: 2 58 47;	fax: 2 58 47
e-mail: iz_karnobat@mail.bg	e-mail: iz_karnobat@mail.bg

**НАУЧНИ ТРУДОВЕ
НА ИНСТИТУТ ПО ЗЕМЕДЕЛИЕ – КАРНОБАТ
Том 2, №1**

**SCIENTIFIC WORKS
OF THE INSTITUTE OF AGRICULTURE – KARNOBAT
Volume 2, No1**

2013

Формат: 70x100/16. Печатни коли: 18,5
Printing format: 70x100/16. Sheets: 18.5

ISSN 1314-961X

СЪДЪРЖАНИЕ

СЕЛЕКЦИОННО-ГЕНЕТИЧНИ ИЗСЛЕДВАНИЯ ПРИ ПОЛСКИ КУЛТУРИ

Productive options in Bulgarian winter wheat varieties in Macedonia	9
<i>Verica Ilieva, Ilija Karov, Ljupcho Mihajlov, Natalija Markova Ruzdic</i>	
Productive characteristics of the Macedonian varieties soybean	15
<i>Ljupcho Mihajlov, Verica Ilieva, Ilija Karov, Natalija Markova Ruzdic</i>	
Селекция на зимен ечемик в Добруджански земеделски институт, град Генерал Тошево	23
<i>Галина Михова</i>	
Продуктивни възможности на български и интродуцирани сортове и линии ечемик при условията на Югоизточна България	39
<i>Дарина Вълчева, Драгомир Вълчев, Тошка Попова, Дарина Димова, Ирфан Озтурк, Реджеп Кая</i>	
Изследване на продуктивната братимост при абисински теф (<i>Eragrostis tef</i> (Zucc.) Trotter), при условията на Южна Добруджа	49
<i>Христо Стоянов</i>	
Генотип x среда ефекти върху признаците на продуктивността на обикновена пшеница. I. Природа на взаимодействието	57
<i>Николай Ценов, Добринка Атанасова, Тодор Губатов</i>	
Селекционен напредък в създаването на генотипове зимуващ овес с повишена устойчивост на полягане	71
<i>Тодорка Савова</i>	
Линии и сортове тритикале, отглеждани при контрастни метеорологични условия	79
<i>Валентин Байчев</i>	
Влияние на сушата върху чистата продуктивност на фотосинтезата на сортове и линии пролетен ечемик	87
<i>Маргарита Гочева, Дарина Вълчева, Драгомир Вълчев</i>	
Корелация между характеристики на класа при сортове обикновена зимна пшеница (<i>Triticum aestivum</i> L.)	95
<i>Христо Стоянов</i>	
“Ирник” — нов сорт тритикале за зърно	105
<i>Валентин Байчев</i>	
Приложение на хексаплоидни амфидиплоиди в селекцията. Отбор в хибридни потомства, получени с участието на сортове твърда пшеница	113
<i>Надя Даскалова, Драгомир Пламенов, Пенко Спецов</i>	

Качество на зърното на български и турски линии и сортове зимен ечемик	121
<i>Дарина Вълчева, Драгомир Вълчев, Тошка Попова, Дарина Димова, Ирфан Озтурк, Реджеп Кая</i>	

Проучване на образци кориандър с различен географски произход	127
<i>Николай Дюлгеров, Боряна Дюлгерова</i>	

Влияние на засушаването върху растежната активност при сортове и линии пролетен ечемик	135
<i>Драгомир Вълчев, Дарина Вълчева, Маргарита Гочева</i>	

Селекционна ценност на образци голозърнест овес (<i>Avena nuda</i> L.)	139
<i>Тодорка Савова, Боряна Дюлгерова</i>	

Влияние на условията на отглеждане върху посевните качества, травмирането на семената и тяхната растежна активност при зимен ечемик	147
<i>Богдан Бончев, Дарина Вълчева</i>	

Генотипни различия в растежната активност на семена от голозърнест ечемик	157
<i>Ивелина Вълчева, Дарина Вълчева</i>	

Девиния — нов зимен пивоварен сорт ечемик	163
<i>Дарина Вълчева, Драгомир Вълчев</i>	

Биологични и стопански качества на зимен двуреден ечемик сорт Одисей	169
<i>Дарина Вълчева, Драгомир Вълчев</i>	

Комбинативна способност на линии фуражен ечемик по показателя дължина на класа	175
<i>Дарина Димова, Дарина Вълчева</i>	

СЕЛЕКЦИОННИ, ИМУНОЛОГИЧНИ И АГРОТЕХНИЧЕСКИ ИЗСЛЕДВАНИЯ ЗА УСТОЙЧИВО ПРОИЗВОДСТВО НА ПОЛСКИ КУЛТУРИ

The influence of the variety and the sowing density on the yield and some quality characteristics on the barley	181
<i>Dragica Spasova, Dusan Spasov, Biljana Atanasova, Mite Ilievski</i>	

Aphids (HOMOPTERA: APHIDIDAE) and their predators, in wheat (<i>Triticum aestivum</i>) and in the weeds from Poaceae family in the Strumica region	187
<i>Dusan Spasov, Dragica Spasova, Biljana Atanasova, Mimoza Serafimova</i>	

Pest insects at tobacco (<i>Nicotiana tabacum</i> L.) in Strumica region, Republic of Macedonia	193
<i>Dusan Spasov, Dragica Spasova, Biljana Atanasova, Mimoza Serafimova</i>	

Изследване ефективността на някои активни вещества върху мицелния растеж на <i>Fusarium graminearum</i>	197
<i>Йорданка Станоева, Илия Илиев</i>	
Проучване на източници на устойчивост към кафява праховита главня (<i>Ustilago nuda</i>) при ечемика (<i>Hordeum vulgare</i>)	203
<i>Тошка Попова</i>	
Реакция на различни генотипове ечемик към три вида <i>FUSARIUM</i>, причинители на фузариоза по класа	211
<i>Ваня Иванова, Галина Михова</i>	
Вирулентно разнообразие в популациите на причинителя на брашнестата мана по пшеницата в България през периода 2010-2012 година	219
<i>Илия Илиев, Йорданка Станоева</i>	
Влияние на агротехнически фактори върху съдържанието на протеин в зърното на ечемик, отглеждан в района на Добруджа	229
<i>Албена Иванова, Галина Михова, Соня Донева</i>	
Видов състав на листни въшки при пролетен ечемик	241
<i>Василина Манева, Маргарита Гочева</i>	
Проучване влияние на посевната норма и азотното торене върху добива на семена от зимна рапицата, отглеждана в района на Странджа	245
<i>Милка Димитрова-Донева</i>	
Проучване реакцията на перспективни линии зимен многореден ечемик към кафява праховита главня (<i>Ustilago nuda</i>)	253
<i>Тошка Попова, Милка Димитрова-Донева, Боряна Дюлгерова, Дарина Димова, Дарина Вълчева, Драгомир Вълчев</i>	
Възможности за съвместното приложение на група пестициди и влиянието им върху добива на кориандъра	259
<i>Василина Манева, Дина Атанасова</i>	
Влияние на метеорологичните условия в два екологични района върху развитието и продуктивността при обикновена пшеница	265
<i>Иван Янчев, Дафинка Иванова, Веселин Иванов</i>	
Влияние на листното торене с Хортигроу върху съдържанието, добива и химичния състав на етеричното масло при обикновен босилек сорт Юбилеен	271
<i>Веселин Иванов, Иван Янчев</i>	
Влияние на предшествениците върху заплевеляването при зърнено-житните култури в биологично земеделие	279
<i>Дина Атанасова, Божан Зарков, Василина Манева</i>	
Влияние на някои технологични фактори върху продуктивността и качеството на твърдата пшеница	287
<i>Христо Джугалов</i>	

CONTENTS

BREEDING GENETIC STUDIES IN FIELD CROPS

Productive options in Bulgarian winter wheat varieties in Macedonia.....	9
<i>Verica Ilieva, Ilija Karov, Ljupcho Mihajlov, Natalija Markova Ruzdic</i>	
Productive characteristics of the Macedonian variety soybean.....	15
<i>Ljupcho Mihajlov, Verica Ilieva, Ilija Karov, Natalija Markova Ruzdic</i>	
Winter barley breeding at Dobrudzha Agricultural Institute – General Toshevo	23
<i>Galina Mihova</i>	
Productive abilities of Bulgarian and introduced varieties and lines barley in Southeast Bulgaria conditions.....	39
<i>Darina Valcheva, Dragomir Vulchev, Toshka Popova, Darina Dimova, Irfan Öztürk, Rejep Kaya</i>	
Study on the productive tillering in Abyssinian teff (Eragrostis tef (Zucc.) Trotter), under the conditions of Southern Dobrudja	49
<i>Hristo Stoyanov</i>	
Genotype x environment effects on the productivity traits of common wheat I. Nature of interaction.....	57
<i>Nikolay Tsenov, Dobrinka Atanasova, Todor Gubatov</i>	
Breeding progress in creating winter oat genotypes with increased lodging resistance	71
<i>Todorka Savova</i>	
Triticale lines and varieties grown under contrasting meteorological conditions	79
<i>Valentin Baychev</i>	
Effect of drought on the net productivity of photosynthesis in varieties and spring barley lines	87
<i>Margarita Gocheva, Darina Valcheva, Dragomir Vulchev</i>	
Correlation between the spike characteristics in common winter wheat varieties (<i>Triticum aestivum</i> L.)	95
<i>Hristo Stoyanov</i>	
“Irnik” – a new cultivar of grain triticale	105
<i>Valentin Baychev</i>	
Application of hexaploid amphidiploids in breeding: Selection in hybrid generations, received with the participation of durum wheat varieties	113
<i>Nadya Daskalova, Dragomir Plamenov, Penko Spetsov</i>	

Grain quality of Bulgarian and Turkish lines and varieties of winter barley	121
<i>Darina Valcheva, Dragomir Vulchev, Toshka Popova, Darina Dimova, Irfan Öztürk, Rejep Kaya</i>	
Study on coriander accessions with different geographic origin	127
<i>Nikolay Dyulgerov, Boryana Dyulgerova</i>	
Effect of drought on growth activity of spring barley varieties and lines	135
<i>Dragomir Vulchev, Darina Vulcheva, Margarita Gocheva</i>	
Breeding value of naked oat (<i>Avena nuda</i> L.) accessions	139
<i>Todorka Savova, Boryana Dyulgerova</i>	
Effect of growing conditions on seed quality, traumatization of the seed and their growth activity in winter barley	147
<i>Bogdan Bonchev, Darina Valcheva</i>	
Genotypic differences in growth activity of seed in hulless barley	157
<i>Ivelina Valcheva, Darina Valcheva</i>	
Deviniya - a new winter malting barley variety	163
<i>Darina Vulcheva, Dragomir Valtchev</i>	
Biological and agronomical characteristics of two-rowed winter barley variety Odyssey	169
<i>Darina Vulcheva, Dragomir Valtchev</i>	
Combining ability for the trait spike length in feed barley lines	175
<i>Darina Dimova, Darina Valcheva</i>	

BREEDING, AGROTECHNICAL AND IMMUNOLOGICAL STUDIES FOR SUSTAINABLE PRODUCTION OF FIELD CROPS

The influence of the variety and the sowing density on the yield and some quality characteristics on the barley	181
<i>Dragica Spasova, Dusan Spasov, Biljana Atanasova, Mite Ilievski</i>	
Aphids (HOMOPTERA: APHIDIDAE) and their predators, in wheat (<i>Triticum aestivum</i>) and in the weeds from Poaceae family in the Strumica region	187
<i>Dusan Spasov, Dragica Spasova, Biljana Atanasova, Mimoza Serafimova</i>	
Pest insects at tobacco (<i>Nicotiana tabacum</i> L.) in Strumica region, Republic of Macedonia	193
<i>Dusan Spasov, Dragica Spasova, Biljana Atanasova, Mimoza Serafimova</i>	
Investigation on the efficiency of some active substances on the mycelium growth of <i>Fusarium graminearum</i>	197
<i>Yordanka Stanoeva, Iliya Iliev</i>	

Study of the sources of resistance to brown loose smut (<i>Ustilago nuda</i>) in barley (<i>Hordeum vulgare</i>)	203
<i>Toshka Popova</i>	
Reaction of different barley genotypes to three types of <i>Fusarium</i>, which cause fusarium head blight	211
<i>Vanya Ivanova, Galina Mihova</i>	
Virulence variability in the populations of the cause agent of powdery mildew on wheat in Bulgaria during 2010-2012	219
<i>Iliya Iliev, Yordanka Stanoeva</i>	
Effect of some agronomy factors on grain protein content of barley grown in the region of Dobrudzha	229
<i>Albena Ivanova, Gallina Mihova, Sonya Doneva</i>	
Species variety of leaf aphids of spring barley	241
<i>Vasilina Maneva, Margarita Gocheva</i>	
Investigation of the sowing rate and nitrogen fertilization on the seed yield of winter oilseed rape grown in the Strandja	245
<i>Milka Dimitrova-Doneva</i>	
Research on the response of perspective lines of six-rowed winter barley to brown loose smut (<i>Ustilago nuda</i>)	253
<i>Toshka Popova, Milka Dimitrova-Doneva, Boryana Dyulgerova, Darina Dimova, Darina Valcheva, Dragomir Vultchev</i>	
Opportunities for combined application group of pesticides and their influence on yield coriander	259
<i>Vasilina Maneva, Dina Atanasova</i>	
Effects of weather conditions in two ecological regions on the development and productivity in common wheat	265
<i>Ivan Yanchev, Dafinka Ivanova, Veselin Ivanov</i>	
The effect of leaf nutrition with Hortigrow on the content, yield and chemical composition of the essential oil from common basil of 'Yubileen' cultivar	271
<i>Veselin Ivanov, Ivan Yanchev</i>	
Influence of predecessor on the weed infestation on cereals in organic farming	279
<i>Dina Atanasova, Bojan Zarkov, Vasilina Maneva</i>	
Influence of some technological factors on durum wheat yield and the grain quality parameters	287
<i>Hristo Dzhugalov</i>	

СЕЛЕКЦИОННО-ГЕНЕТИЧНИ ИЗСЛЕДВАНИЯ ПРИ ПОЛСКИ КУЛТУРИ

PRODUCTIVE OPTIONS IN BULGARIAN WINTER WHEAT VARIETIES IN MACEDONIA

Verica Ilieva¹, Ilija Karov², Ljupcho Mihajlov¹, Natalija Markova Ruzdik¹

¹Goce Delchev Univeristy, Faculty of Agriculture,
Department of Crop Production, 89, Goce Delchev str., p.o.box 201,
Shtip 2000, Republic of Macedonia, www.ugd.edu.mk

²Goce Delchev Univeristy, Faculty of Agriculture,
Department for Plant and Environment Protection, Goce Delchev str.,
p.o.box 201, Shtip 2000, Republic of Macedonia, www.ugd.edu.mk

Abstract

In the period 2010-2011 were conducted investigation on the productivity in five Bulgarian winter wheat varieties (*pobeda*, *momchil*, *carevec*, *fermer* and *guiness*) in agro climatic conditions of the Republic of Macedonia. The results show that the investigated varieties are suitable for cultivation in our production conditions. In the two years of testing the best average yield is obtained from varieties *momchil*, *guiness* and *pobeda*. The yield achieved in these varieties is statistically higher than the yield achieved in the domestic standard variety *mila*. The yield from varieties *fermer* and *carevec* doesn't show a significant statistical difference compared to the standard variety.

Key words: winter wheat, variety, productive characteristics.

INTRODUCTION

Winter wheat (*Triticum aestivum* L.) is one of the most important cereal crops in Macedonia. With the average planted area of about 100.000 ha per year, this crop covering 50 % of the total area under cereals. Average yields in recent years range from 2,5 – 3,2 t/ha⁻¹, and do not provide the total domestic demand for wheat. The main limiting factors in production are unfavorable agro-ecological conditions that occur with different intensity in different regions and years, as the poor economic condition of farmers, leading to incomplete and incorrect application of agro-technical measures in production.

The grain yield is a complex quantitative property controlled by polygenes. The external factors have great influence on this property (Milovanović et al. 2002, Musa et al. 2003, Denčić et al. 2006, Drezner et al. 2006, Rekanović et al. 2007). For maximum utilization of cultivation conditions and achieve better yields per unit area, are needed varieties with good biological plasticity, which means varieties with good adaptability in different agro-ecological conditions. Current sorting of wheat production in Macedonia consist of domestic local and newly created varieties, and approved foreign varieties.

The purpose of conducted researches is to determine the production characteristics of the tested varieties in terms of Ovce pole region and to determine the most suitable for the region.

MATERIALS AND METHODS

In this paper are examined the production opportunities of five Bulgarian varieties soft wheat in agro-ecological and production conditions in Macedonia. As a material were used varieties *pobeda*, *momchil*, *carevec*, *fermer* and *guiness*, which are a selection of Institute for Plant Genetic Resources Sadovo in Bulgaria, compared with domestic variety *mila*, selection of research center “Uniservis agro” Strumica, Faculty of Agriculture, University “Goce Delchev” – Stip. *Mila* variety is dominant domestic variety in sorting production in our country and from the Bulgarian varieties, variety *momchil*, starting from 2007, is on the national variety list as a foreign variety approved for production in Macedonia.

The researches were conducted during the vegetation period in 2010/2011 and 2011/2012, on the areas of the production unit “Uniservis agro” Faculty of Agriculture, University “Goce Delchev” – Stip, in Amzabegovo place.

The experiment was set by random block system, the size of experimental plots was 5 m², with three replications. Before sowing the experimental area was barley. Standard technology for production was applied, except the sowing, which is done after the optimal time, in early December. Fertilizer was applied at the rate of 76 kg/ha⁻¹ N, 30 kg/ha⁻¹ P₂O₅ and 30 kg/ha⁻¹ K₂O (200 kg/ha⁻¹ NPK 15:15:15 and 100 kg/ha⁻¹ Urea 46 %) before sowing, and 92 kg/ha⁻¹ N during spring nourishment (200 kg/ha⁻¹ Urea 46 %).

From this research is analyzed the grain yield and its main components, height of stem, length of spike, number of grains per spike and weight of 1000 grain. The following parameters were computed: the average value (\bar{X}), the error of mean ($S_{\bar{X}}$) and the standard deviation (S).

The results were processed with the statistical program SPSS. The differences between varieties in terms of yield were tested by the LSD-test.

SOIL AND CLIMATIC CONDITIONS

According to the obtained results of chemical analysis performed on the soil surface, the same belongs to the soil type smolnica with stable mechanical structure and favorable structure that provides optimal wet, air and heat mode. According to the chemical composition, the soil is well supplied with total nitrogen (0,98 mg/100 g soil), medium provided with readily available phosphorus (24,19 mg/100 g soil) and highly secured by readily available potassium (74,1 mg/100 g soil), with a neutral to slightly basic pH reaction (pH in H₂O = 7, the KCL = 7,90). The content of humus in the surface layer is small (2,50 to 2,79 %).

According to Filipovski et al. (1996), the Republic of Macedonia is divided into eight climate-vegetation – soil areas. Ovce pole valley, which includes the Amzabegovo place where are performed the researches (altitude 230 m), belongs to the second group with moderately continental and negative components of a Mediterranean climate. The openness of the valley from all sides also affects the specific climatic conditions, mostly on wind. Consequently of this, the valley is characterized by large temperature fluctuations and uneven arrangement of rainfall throughout the year.

The data in Figure 1 and 2 show that in the period of tests there are not registered extreme variations of temperature conditions, except for December, which at first year was characterized by much higher values compared to the second year of trials. The amount of precipitation is with negative schedule by

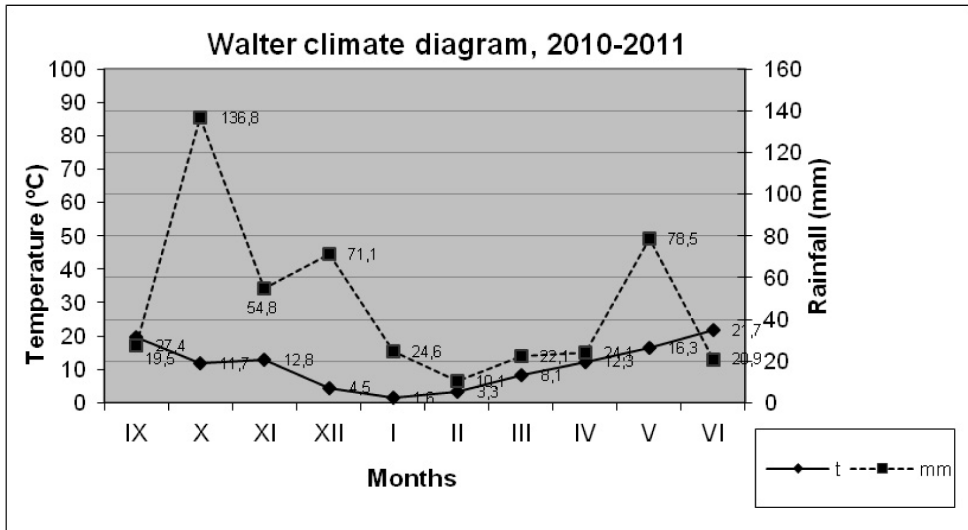


Figure 1. Walter climate diagram, 2010-2011

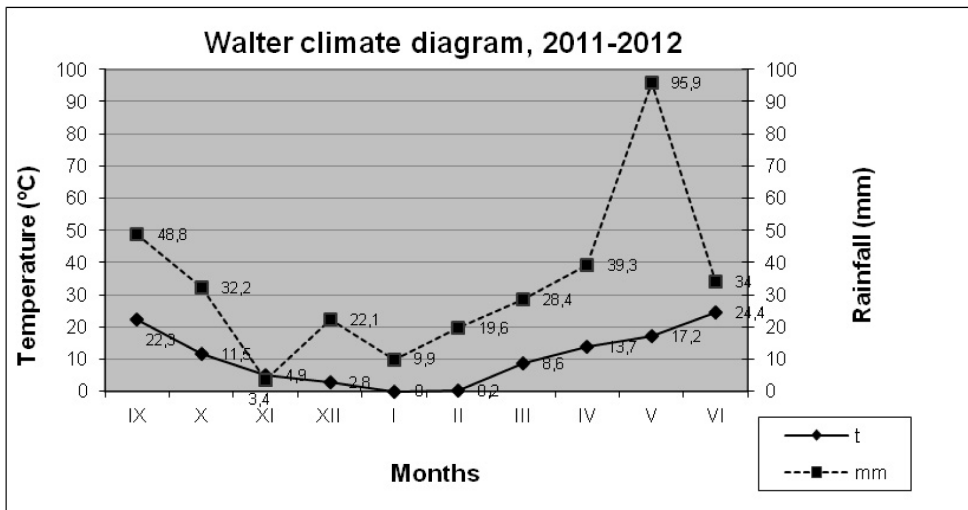


Figure 2. Walter climate diagram, 2011-2012

months. The driest month is November in the second year of trials. But particularly negative impact on yield have months March, April and June, which are relatively dry. A key role in the improvement of crops in both years of investigations had rainfall in May.

RESULTS AND DISCUSSION

Estimates of the value of a given variety are mainly based on assessment of its morphological – biological and production properties. High yield potential and good quality are the basic technological features to be recommended one variety of production. Special significance has their stability, ie the ability of a genotype in different agro-ecological conditions to maintain similar values for these properties, or to what extent the properties vary under the influence of year (Ilieva et al., 2008).

Average values of grain yield at examined varieties wheat grown in Ovce pole region during 2010/11 and 2011/12 are shown in Table 1. Analysis of the results shows that in the both years of tests, all tested varieties have a higher grain yield than the standard variety. The highest yield in both years was obtained from a variety *momchil* (5,733 t/ha⁻¹ in 2010/11 and 5,533 t/ha⁻¹ in 2011/12). After variety *momchil* follow: *guiness*, (5,667 t/ha⁻¹ in 2010/11 and 5,533 t/ha⁻¹ in 2011/12), *pobeda*, (5,333 t/ha⁻¹ in 2010/11 and 5,267 t/ha⁻¹ in 2011/12), *fermer* (5,067 t/ha⁻¹ in 2010/11 and 5,150 t/ha⁻¹ in 2011/12) and *carevec*, (4,867 t/ha⁻¹ in 2010/11 and 4,833 t/ha⁻¹ in 2011/12). The obtained average yield of standard variety *mila* amounts 4,600 t/ha⁻¹ in 2010/11 and 4,533 t/ha⁻¹ in 2011/12.

Table 1. Average values of grain yield of wheat varieties tested (2010-2012)

Property	Variety	2010/2011			2011/2012			Average		
		X	S	S _x	X	S	S _x	X	S	S _x
Grain yield (t/ha ⁻¹)	Mila	4,600	0,600	0,346	4,533	0,503	0,290	4,566	0,047	0,033
	Pobeda	5,333**	0,115	0,067	5,267**	0,058	0,033	5,300	0,046	0,033
	Momchil	5,733**	0,115	0,067	5,533**	0,058	0,033	5,633	0,141	0,100
	Carevec	4,867	0,115	0,067	4,833	0,115	0,066	4,849	0,023	0,016
	Fermer	5,067	0,115	0,067	5,150*	0,132	0,076	5,108	0,058	0,041
	Guiness	5,667**	0,115	0,067	5,533**	0,208	0,120	5,599	0,094	0,066
Level of importance (LSD)	2010/11	0,05	0,512							
		0,01	0,729							
	2011/12	0,05	0,468							
		0,01	0,665							

Higher yield at varieties *momchil*, *guiness* and *pobeda*, is statistically significantly higher than standard variety, for both tested levels of importance in both experimental years. The yield of the variety *fermer* is statistically significant higher only for the level of probability 0,05 in 2011/12. At variety *carevec* positive difference terms to standard variety is not statistically significant in both years of researches. *Guiness* variety is suitable for growing in dry conditions (Mangova & Kolev, 2011).

In table 2 are given the obtained results of the examination of some of the major structural components of yield.

The plant height is significant property because the high varieties in most cases are more inclined to lodging. In these studies all examined varieties are higher than the standard variety. In average, plant height ranges from 95,58 cm in variety *carevec* to 110,33 cm in variety *pobeda*, in 2010/11 and 96,83 cm also at the variety *carevec* to 115,07 cm in variety *pobeda*. In both years of testing not observed lodging in the tested varieties.

Table 2. Average values of observed traits with wheat varieties tested (2010-2012)

Properties	Variety	2010/2011			2011/2012			Average		
		X	S	S _x	X	S	S _x	X	S	S _x
Plant height (cm)	Mila	81,27	3,08	0,80	82,66	3,96	1,02	81,97	0,98	0,70
	Pobeda	110,33	8,78	2,27	115,07	4,73	1,22	112,70	3,35	2,37
	Momchil	105,50	5,32	1,53	108,08	5,20	1,50	106,79	1,82	1,29
	Carevec	95,58	4,08	1,18	96,83	4,57	1,32	96,34	0,69	0,49
	Fermer	103,17	3,04	0,88	105,92	3,42	0,99	104,55	1,94	1,38
	Guinness	105,33	4,85	1,25	101,20	7,40	1,91	103,27	2,92	2,07
Spike length (cm)	Mila	10,00	0,65	0,17	10,53	0,74	0,19	10,27	0,70	0,18
	Pobeda	9,40	0,63	0,16	9,33	0,82	0,21	9,37	0,05	0,04
	Momchil	8,87	1,13	0,29	8,73	0,70	0,18	8,80	0,10	0,07
	Carevec	10,20	0,56	0,14	9,33	0,96	0,25	9,77	0,62	0,44
	Fermer	9,07	0,88	0,23	10,13	0,74	0,19	9,60	0,75	0,53
	Guinness	9,66	0,62	0,16	9,60	0,99	0,25	9,63	0,04	0,03
Number of grains per spike	Mila	31,20	6,23	1,61	29,93	5,28	1,36	30,57	0,90	0,64
	Pobeda	39,40	8,34	2,15	47,66	10,50	2,71	43,53	5,84	4,13
	Momchil	36,87	6,83	1,76	31,93	5,91	1,53	34,40	3,49	2,47
	Carevec	29,13	9,03	2,33	31,40	5,36	1,38	30,23	0,98	1,13
	Fermer	38,60	6,14	1,59	40,20	7,61	1,96	39,40	1,13	0,80
	Guinness	42,47	7,33	1,89	44,87	8,75	2,26	43,66	1,70	1,20
1000 grain weight (g)	Mila	43,97	4,72	2,73	40,35	4,36	2,52	42,16	4,54	2,62
	Pobeda	44,97	2,00	1,15	40,91	5,78	3,34	42,94	3,89	2,25
	Momchil	49,91	2,73	1,57	50,64	1,35	0,78	50,27	2,04	1,18
	Carevec	46,55	2,83	1,64	43,88	3,65	2,11	45,21	3,24	1,87
	Fermer	44,65	0,04	0,02	44,10	1,71	0,99	44,37	0,88	0,51
	Guinness	41,53	6,79	3,92	39,58	1,69	0,98	40,55	4,24	2,45

The greatest spike length in 2010/11 were characterized variety *carevec* (10,20 cm), and in 2011/12 standard variety *mila* (10,53 cm). *Momchil* variety has the smallest spike length in both years (8,87 cm in 2010/11 and 8,73 cm in 2011/12). The obtained results show inversely proportional relationship between grain yield and spike length.

Among the most important structural elements of yield are the number of grains per spike and 1000 grain weight. In 2010/11 the highest average number of grains per spike has a variety *guinness* (42,47), while in 2011/12 variety *pobeda* (47,66). According to the average values of the both years the most grains per spike has variety *guinness* (43,66), and the smallest variety *carevec*. The number of grains per spike in the standard variety *mila* amounts to 31,20 in 2010/11 and 29,23 in 2011/12.

Data for 1000 grain weight showed that in both years of testing, the variety *momchil* achieve the highest value for this property (49,91 g in 2010/11 and 50,64 g in 2011/12), compared to the other tested varieties. The smallest average value of 1000 grains as in the first and in the second year of tests has variety *guinness* (41,53 g in 2010/11 and 39,58 g in 2011/12). All tested varieties have greater mass of 1000 grains in the first year of researches, except the variety *momchil*, which the mass of 1000 grains scored in the second year.

Analyzing all the results together, at some varieties may have noticed a certain distortion between some of the examined properties, especially between yield and other traits. Because the yield is characteristic of variety, whose values influence many other factors, the reason for this may be another factor or characteristic that has not been studied in this research (such as the number of plants and productive spike per unit area).

CONCLUSIONS

Based on the conducted researches can be made the following conclusions:

- In terms of the test area the yield of all tested varieties exceeded the yield of the standard variety *mila*;
- Overcoming yield in terms standard variety, an average of both years of investigation ranges from 6,20 % for the variety *carevec*, to 23,37 % for the variety *momchil*;
- All tested varieties suited to growing in soil – climatic and production conditions Ovce pole area, especially varieties *momchil*, *guiness* and *pobeda*, whose positive differences in terms of standard variety *mila* are statistically significant in both years of examination.

REFERENCES

- Denčić, S., Mladenov, N., Kobiljski, B., Hristov, N., Rončević, P., Đurić, V., 2006. Rezultati 65-godišnjeg rada na oplemenjivanju pšenice u Naučnom institutu za ratarstvo I povrtarstvo, Novi Sad. Zbornik radova Instituta za ratarstvo I povrtarstvo, 42(1), 339-361.
- Drezner, G., Dvojković, K., Novoselović, D., Horva, Daniela, Guberac, V., Marić S., Primorac, J., 2006. Utečaj okoline na najznačajnija kvantitativna svojstva pšenice. Zbornik radova 41 Hrvatski I 1 Međunarodni Znanstveni Simpozij Agronoma. Zbornik radova, Osijek, 181-182.
- Ilieva, V., D. Andreevska, N. Markova, 2008. Growth and productional – technological characteristics of introductional genotypes of rice (*Oryza sativa* L.) in agroecological conditions in the region of Kocani. Yearbook of Goce Delcev University – Stip, Faculty of Agriculture. Vol. VIII: 27-36, Stip.
- Mangova, M., Kolev, K., 2011. Kyield and quality of bread wheat varieties created in the institute of plant genetic resources in Sadovo, Bulgatia. Macedonian Journal of Animal Science, Vol. 2, No. 1, pp. 47-52.
- Milovanović, M., Maksimović, D., Perišić, V., Kovačević, B., Kuburović, M., Kostadinović, S., Jestrović, Z., Staletić, M., 2002. Dostignuća I novi pravci u oplemenjivanju I proizvodnju semena kragujevačkih sorti strnih žita. Nauka, praksa I promet u agraru, III savetovanje, Agroinovacije, Soko Banja, Zbornik radova, 57-65.
- Musa F., Carli C., Jashanica V., Ramadani S., Kelmendi B., 2003. Value for Cultivation and Use of some wheat cultivars in Agroekological Condition of Dukagjini Area. „Kërkime – Akademia e Shkencave dhe Arteve të Kosovës. Prishinë.
- National variety list of Republic of Macedonia, 2008. Ministry of agriculture, forestry and water economy of Republic of Macedonia, Directorate of seed and seedling material, p.146.
- Rekanović, M., Ivanović, M., Baucal, G., 2007. Analiza proizvodnje ratarskih useva u PKB korporaciji u 2006 godini. Zbornik naunih radova, 13 (1-2), 7-14.
- Филиповски, Ѓ., Ризовски, Р., Ристевски П., 1996. Карактеристики на климатско-вегетациско-почвените зони (региони) во Р. Македонија. МАНУ, Скопје, стр. 138.